

### **ABSTRACT**

An adaptive digitally tuned light source is disclosed, in the form of a de-dispersive imaging spectrograph in both the visible and near infrared spectral regions. The devices are  
5 capable of illuminating a sample with appropriate energy-weighted spectral bands or spatio-spectral bands that relate only to the constituents of interest. The energy from each of the spectral resolution elements can be digitally modulated to provide a tuned weighted spectral output. A tuned light source device based on the present disclosure can be adapted for use  
10 in a conventional imaging microscope system to enable direct measure of spatio-spectral features of interest.